

CLAIMS

What is claimed is:

1. A system, comprising
 - a first base transceiver (BTS) unit that receives on a first primary uplink frequency and is capable of adding at least one secondary uplink frequency, and the first BTS transmits on a first primary downlink frequency and is capable of adding at least one secondary downlink frequency;
 - a second BTS that receives on a second primary uplink frequency and is capable of adding at least one secondary uplink frequency, and the second BTS transmits on a second primary downlink frequency and is capable of adding at least one secondary downlink frequency; and
 - a controller associated with the first BTS and the second BTS, the controller controls to which of at least the first and second BTS's a mobile unit should be connected based on a signal received by the first and second BTS's from the mobile unit, the controller causes one of the first and second BTS's to add a new carrier to communicate with the mobile unit based on the controller determining that the mobile unit should switch to the one of the first and second BTS's.
2. The system of claim 1, wherein the controller causes the one of the first and second BTS's to transmit a message to the mobile unit to enable the mobile unit to switch to at least one of a new uplink frequency and a new downlink frequency for communication with the one of the first and second BTS's.
3. The system of claim 1, wherein at least one of the first and second BTS's provides information to the controller based on the signal received from the mobile unit by the at least one of the first and second BTS's, the controller controlling to which of at least the first and second BTS's the mobile unit should be connected based on the information provided by the first and second BTS's.

4. The system of claim 3, wherein the information provided by the first and second BTS's include at least a substantial portion of the signal received from the mobile unit, the controller combines the at least a substantial portion of the signal provided by the first and second BTS's to ascertain to which of at least the first and second BTS's the mobile unit should be connected.
5. The system of claim 3, wherein the controller employs the information provided by the first and second BTS's to determine characteristics associated with at least one of a propagation environment and signal interference for the mobile unit, the controller controlling to which of the first and second BTS's the mobile unit should be connected based on the at least one of a propagation environment and signal interference for the mobile unit.
6. The system of claim 3, the controller further comprising a combining unit for combining the signal received from the first BTS with the second BTS for improved reception of the signal from the mobile unit.
7. The system of claim 1, wherein the new carrier for the second BTS is on the first BTS's primary downlink frequency.
8. The system of claim 6, wherein the new carrier is deleted by the BTS after the mobile unit has completed switching to the one of the first and second BTS.
9. The system of claim 1 wherein the new carrier is on a predetermined contingent frequency.
10. The system of claim 1, the controller further comprising a memory containing carrier allocation data, the carrier allocation data comprising carrier data for the first BTS, the second BTS, and the mobile unit.

11. The system of claim 10, the carrier data comprising the first primary uplink frequency and the second primary uplink frequency.
12. The system of claim 10, the carrier allocation data comprising a contingent frequency plan with a contingent frequency for each mobile unit to switch to when the mobile unit is unable to adequately communicate with the at least one of the first and second BTS's to which the mobile unit is connected.
13. The system of claim 12, wherein the contingent frequency plan is updated at a predetermined interval.
14. The system of claim 13 wherein the predetermined interval is every burst.
15. The system of claim 12 wherein the contingent frequency plan rotates the contingent frequency for each mobile unit among a pre-selected plurality of frequencies provided by the contingent frequency plan.
16. A system, comprising
 - a plurality of base transceivers (BTS's), each BTS receives a primary uplink frequency and transmits at a primary downlink frequency for communicating as a primary BTS with assigned mobile units, and each BTS unit being capable as a secondary BTS to monitor at least one additional frequency associated with an unassigned mobile unit; and
 - a controller that receives information from the plurality of BTS's based on signals each BTS receives from respective assigned mobile units and at least one unassigned mobile unit.
17. The system of claim 16, the controller further comprising a combining unit for combining the data sent by each BTS to improve reception of the signal from the mobile units in the system.

18. The system of claim 16, further comprising the controller commanding one of a primary BTS and a secondary BTS to send soft handover data to a given mobile for controlling to which of at least the first and second BTS's the mobile unit should be connected based on the information received from the plurality of BTS's.

19. The system of claim 16, wherein the controller employs the information received from the plurality of BTS's to determine characteristics associated with at least one of a propagation environment and signal interference for the mobile unit, the controller controlling to which of the first and second BTS's the mobile unit should be connected based on the at least one of a propagation environment and signal interference for the mobile unit..

20. The system of claim 16, the information further comprising at least one of received signal strengths, signal interference, error rate, direction of travel, carrier to noise ratio and load balancing.

21. The system of claim 16, the controller commanding one of the secondary BTS's to become a new primary BTS for the mobile unit and to notify the mobile unit to switch to the new BTS.

22. The system of claim 16, the controller providing a contingency plan to each of the plurality of BTS's for instructing at least the assigned mobile units to enable handover to a selected secondary BTS identified by the contingency plan.

23. The system of claim 22, the contingency plan further comprises a contingent frequency associated with the selected secondary BTS for the mobile unit to switch to in the event the mobile unit loses contact with the primary BTS.

24. The system of claim 22, the controller updating the contingency plan at a predetermined interval.

25. The system of claim 22, the controller instructing the selected secondary BTS to add a carrier to contact a selected one of the assigned mobile units on one of a frequency for the primary BTS and a contingent frequency provided in the contingency plan.
26. The system of claim 22, wherein the selected secondary BTS communicates with the selected one of the assigned mobile units during an unused time slot for the selected one of the assigned mobile units.
27. The system of claim 16, the at least one additional frequency comprises the primary uplink frequency for at least an adjacent one of the plurality of BTS's.
28. A controller, comprising:
 - means for providing a plan to a mobile unit, the plan comprising a contingent carrier for the mobile unit to switch to in the event of carrier loss; and
 - means for assigning a contingent BTS to the mobile unit for communicating with the mobile unit on the new carrier.
29. The controller of claim 28, further comprising means for updating the plan at a predetermined interval.

30. The controller of claim 28 in a communications system, the communications system further comprising:

means for determining that at least one of no signal and an inadequate signal was received from the mobile unit by a primary BTS associated with the mobile unit;

means for causing the primary BTS to stop transmitting during a time slot assigned to the mobile unit based on the determination;

means for causing the contingent BTS to add the contingent carrier at a first downlink frequency; and

means for causing the contingent BTS to send a signal on the carrier during the time slot assigned to the mobile unit.

31. The controller of claim 28 in a communications system, the communications system further comprising:

means for monitoring a predetermined contingency frequency, the predetermined contingency frequency being used by the mobile unit when the mobile unit cannot adequately communicate with a primary BTS associated with the mobile unit.

32. The communications system of claim 31 further comprising means for removing the contingent carrier after establishing a connection between the contingent BTS and the mobile unit.

33. A method for implementing soft handover at a first base transceiver (BTS) unit, comprising:

monitoring a connection between a mobile unit and a second BTS;

adding a downlink carrier for the first BTS to communicate with the mobile unit; and

sending a signal to the mobile unit to cause the mobile unit to switch from the connection with the second BTS and to connect with the first BTS via the downlink carrier.

34. The method of claim 33, the signal comprises an uplink frequency for the mobile unit to communicate with the first BTS.

35. The method of claim 33, further comprising monitoring a predetermined contingency frequency by the first BTS, the predetermined contingency frequency being used by the mobile unit when the mobile unit cannot adequately communicate with the second BTS.

36. The method of claim 35 wherein the downlink carrier is sent on the predetermined contingency frequency.

37. The method of claim 36, further comprising removing the downlink carrier after establishing a connection between the first BTS and the mobile unit.

38. The method of claim 33, further comprising:
transmitting a plan to the mobile unit, the plan comprising a contingent carrier for the mobile unit to switch to in the event of carrier loss; and
assigning a contingent primary BTS unit to the mobile unit for communicating with the mobile unit on the contingent carrier.

39. The method of claim 38, further comprising updating the contingent carrier of the plan at a predetermined interval.

40. The method of claim 33, further comprising:
determining that at least one of no signal and an inadequate signal was received from the mobile unit by the second BTS unit; and
causing the second BTS to stop transmitting during a time slot assigned to the mobile unit based on the determination.